Exercise Solutions for Math 20

The Point Function and Circular Functions

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1 Determine the quadrant where each of the following points lie.

1.1 $P(\frac{23\pi}{5})$

$\Rightarrow 4\pi + \frac{3\pi}{5}$	Rewrite.
$\Rightarrow \frac{3\pi}{5} \in (\pi, \frac{\pi}{2})$	
$\Rightarrow$ QII.	Final answer.
	■

1.2 $P(-\frac{17\pi}{9})$

$\Rightarrow -\frac{17\pi}{9} \in (-\frac{3\pi}{2}, -2\pi)$	
$\Rightarrow$ QI.	Final answer.
	■

1.3 $P(-2)$

$\Rightarrow -2 \in (-\frac{\pi}{2}, -\pi)$	$\frac{\pi}{2} = 1.5708$
$\Rightarrow$ QIII.	Final answer.
	■

1.4 $P(4.71)$

$\Rightarrow 4.71 \in (\pi, \frac{3\pi}{2})$	$\frac{3\pi}{2} = 4.7124$
$\Rightarrow$ QIII.	Final answer.
	■

2 Complete the following table.

θ	$P(\theta)$	$\cos\theta$	$\sin\theta$	$\tan\theta$	$\cot\theta$	$\sec\theta$	$\csc\theta$
0	$(1,0)$	1	0	0	undefined	1	undefined
$\frac{\pi}{6}$	$(\frac{\sqrt{3}}{2},\frac{1}{2})$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2
$\frac{\pi}{4}$	$(\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2})$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	$\sqrt{2}$	$\sqrt{2}$
$\frac{\pi}{3}$	$(\frac{1}{2},\frac{\sqrt{3}}{2})$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$
$\frac{\pi}{2}$	$(0,1)$	0	1	undefined	0	undefined	1
$\frac{2\pi}{3}$	$(-\frac{1}{2},\frac{\sqrt{3}}{2})$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\sqrt{3}$	$-\frac{\sqrt{3}}{3}$	-2	$\frac{2\sqrt{3}}{3}$
$\frac{3\pi}{4}$	$(-\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2})$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	-1	$-\sqrt{2}$	$\sqrt{2}$
$\frac{5\pi}{6}$	$(-\frac{\sqrt{3}}{2},\frac{1}{2})$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$	$-\frac{2\sqrt{3}}{3}$	2
π	$(-1,0)$	-1	0	0	undefined	-1	undefined
$\frac{7\pi}{6}$	$(-\frac{\sqrt{3}}{2},-\frac{1}{2})$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$-\frac{2\sqrt{3}}{3}$	-2
$\frac{5\pi}{4}$	$(-\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2})$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1	1	$-\sqrt{2}$	$-\sqrt{2}$
$\frac{4\pi}{3}$	$(-\frac{1}{2},-\frac{\sqrt{3}}{2})$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	-2	$-\frac{2\sqrt{3}}{3}$
$\frac{3\pi}{2}$	$(0,-1)$	0	-1	undefined	0	undefined	-1
$\frac{5\pi}{3}$	$(\frac{1}{2},-\frac{\sqrt{3}}{2})$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\sqrt{3}$	$-\frac{\sqrt{3}}{3}$	2	$-\frac{2\sqrt{3}}{3}$
$\frac{7\pi}{4}$	$(\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2})$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	-1	$\sqrt{2}$	$-\sqrt{2}$
$\frac{11\pi}{6}$	$(\frac{\sqrt{3}}{2},-\frac{1}{2})$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	-2
2π	$(1,0)$	1	0	0	undefined	1	undefined